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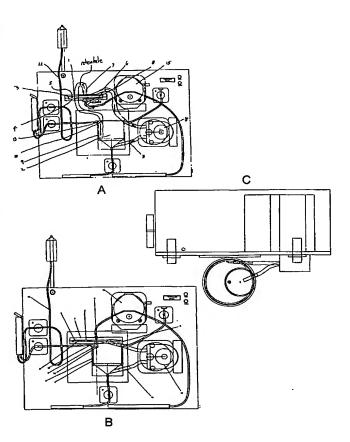
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(54) Title: TANGENTIAL FLOW FILTRATION DEVICES AND METHODS FOR LEUKOCYTE ENRICHMENT



(57) Abstract: The present invention provides tangential flow filtration devices and methods for enriching a heterogeneous mixture of blood constituents for leukocytes by removal of non-leukocyte blood constituents. In one particular embodiment the device can provide a composition enriched in monocytes. One embodiment includes a remover unit (1) having a crossflow chamber (3) separated by a microporous filter (5) from a filtrate chamber (4), the remover unit (1) also having a tangential flow inlet (6), a fluid outlet (7) for a fluid enriched in leukocytes and a filtrate outlet (8).



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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched					
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)					
C. DOCUMENTS CONSIDERED TO BE RELEVANT					
Category *	Citation of document, with indication, where appropriate, of the relevant passages		Relevant to claim No.		
Y,P	US 6,497,821 B1 (BELLAMY JR. et al) 24 December 2002, see entire document		1-69		
Y	US 6,398,956 B1 (COVILLE et al) 04 June 2002, see entire document		1-69		
Y	US 6,194,204 B1 (CRAWFORD et al) 27 February 2001, see entire document		12-22,36-39 and 50-69		
Y	US 5,695,653 A (GSELL et al) 09 December 1997,	see entire document	1-69		
Y US 5,690,815 A (KRASNOFF et al) 25 November 19		997, see entire document	1-69		
Y	US 4,420,398 A (CASTINO et al) 13 December 1983, see entire document				
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